Evacuation techniques during different phases of the tactical environment

Techniki ewakuacji poszkodowanego w poszczególnych fazach prowadzenia działań w środowisku taktycznym

Maciej Sip[1], Marek Dąbrowski[1], Tomasz Sanak[2], Agata Dąbrowska[1], Marcin Zieliński[1], Przemysław Kluj[3]

[1] Institute of Rescue and Catastrophe Medicine, Poznań University of Medical Sciences. Acting Head: Magdalena Witt MD, PhD
[2] Institute of Tactical Combat Care, Military Institute of Medicine in Warsaw. Acting Head: Lt. Col. Robert Brzozowski MD, PhD
[3] Emergency Medicine Division, Department of Anaesthesiology and Intensive Care of the Medical University of Łódź. Head: Prof. Tomasz Gaszyński MD, PhD

Abstract. Combat operations and the implementation of high-risk tasks can generate a high number of dead and wounded soldiers. Taking steps to minimize losses during combat tasks is treated as a priority. The evacuation of casualties from the battlefield depends on the current tactical situation, the changing environment, and the available forces and means. Moving the wounded from the CUF (Care Under Fire) area to TFC (Tactical Field Care) takes place at various levels, resulting from the knowledge and tactical training of the soldiers and the availability of emergency equipment. Rapid and safe evacuation of casualties from the danger zone to the medical care zone enables the use of procedures that significantly increase the battlefield survival rate.
Keywords: TCCC, evacuation, MEDEVAC

Streszczenie. Działanie w warunkach bojowych i realizacja zadań związanych z dużym ryzykiem może prowadzić do dużych strat sanitarnych. Priorytetem jest podjęcie czynności mających na celu wykonanie zadania bojowego przy jednoczesnym zminimalizowaniu strat własnych. Ewakuacja poszkodowanych z pola walki jest uzależniona od aktualnej sytuacji taktycznej, zmieniającego się środowiska oraz dostępnych sił i środków. Przemieszczanie rannego ze strefy CUF (*care under fire)* do TFC *[tactical field care)* odbywa się na różnych poziomach zaawansowania, wynikających z wiedzy i taktycznego wyszkolenia żołnierzy oraz dostępności sprzętu ewakuacyjnego. Szybka i bezpieczna ewakuacja poszkodowanego ze strefy zagrożenia do strefy opieki medycznej umożliwia zastosowanie procedur zwiększających prawdopodobieństwo przeżycia na polu walki.
słowa kluczowe: TCCC, ewakuacja, MEDEVAC

Delivered: 6.02.2014. Accepted for print: 30.05.2014
No conflicts of interest were declared.
Mil. Phys., 2014; 92 (4): 440-448

Corresponding author:
Tomasz Sanak MSc
Institute of Tactical Combat Care, Military Institute of Medicine
128 Szaserów St., 04-141 Warsaw
telephone: +48 504 445 152
e-mail: tsanak@wim.mil.pl

Introduction

Medical evacuation under tactical conditions involves a sequence of changing events and circumstances, posing a range of challenges and problems to the rescuer.

The evacuation of casualties from the danger zone is a great burden on the combat unit and its difficulty varies, depending on the available forces, resources and type of terrain. The success of the evacuation process depends partly on the changing tactical situation (quick reaction to danger and moving casualties from the danger zone behind the shield or directly to the TFC zone) [1].

Rescue activities must be dynamic and at the same time safe for the casualty; therefore the technique chosen should take into consideration the distances to be covered and the current condition of the person who needs help.

While operating in difficult environmental and tactical conditions that may impede the evacuation,

Figure 1. Casualty evacuation from a CUF area; the casualty is dragged by a single rescuer (source: Mikołaj Wegnerowicz/KWP Poznań)

Rycina 1. Ewakuacja poszkodowanego z CUF techniką ciągnięcia przez jednego ratownika (źródło: Mikołaj Wegnerowicz/KWP Poznań)

Figure 2. Casualty evacuation from a CUF area; the casualty is dragged by two rescuers (source: Tactical Medical Solutions)

Rycina 2. Ewakuacja poszkodowanego z CUF techniką ciągnięcia przez dwóch ratowników (źródło: Tactical Medical Solutions)

light and sound discipline must be observed. Light discipline includes restrictions stemming from the ban on using light sources (especially white light) in conditions of darkness related to the time of the day while helping the casualty in a CUF area [2]. Sound discipline involves minimizing the volume of the voice in verbal communication with the casualty or between the rescue team members in the danger zone. If sound discipline is not required, a casualty classified as V on the AVPU scale should be given loud orders from behind cover, commanding his self-evacuation to a safe place [3]. Using the remote access methodology (RAM) to assess the condition of the injured involves giving voice commands or using optical devices without the need to increase risk by approaching the casualty.

Maintaining light and sound discipline is aimed at masking the current location of the casualty on the battlefield and preventing the enemy from finding it.

The availability of advanced evacuation equipment during tactical activities is usually restricted to the minimum, especially in situations where no vehicles are used and the soldiers carry additional munitions and combat assets at the expense of evacuation equipment. In such circumstances, the easiest evacuation methods are used (no equipment, based on the strength of the muscles – carrying or dragging the casualty [Fig. 1. and 2.]). The activities are aimed at limiting the scope of the medical procedures and, consequently, at shortening the time of stay in the CUF area, according to the rule "good medicine may make bad tactics" [4].

Care under fire (CUF)

In the CUF area, the most frequent techniques are man-carries, if the casualty, due to his condition, cannot evacuate himself from the danger zone and hide behind cover. In the danger zone, the tactical situation does not allow rescuers to use evacuation devices. Buddy carries and simple, multifunctional tapes and lanyards are used. Special systems built into the soldier's clothes or tactical vest (tapes and grips) are also used to facilitate evacuation. Such solutions enable quick evacuation of the casualty to a safe place with the use of simple dragging techniques. Training in simulated conditions before activities in the tactical environment should prepare the soldier physically and increase his knowledge of possible emergencies during combat operations.

The evacuation of the casualty is usually highly problematic. The weight of the casualty together with the rescuer's equipment means the rescuer needs to undertake substantial physical effort. Evacuation is always indicated when the casualty is unable to move to the safety zone without help. A ballistic trauma to the lower limbs or the pelvis leads to a loss of mobility

Figure 3. Casualty evacuation from a CUF area using the "fireman's carry" (source: Mikołaj Wegnerowicz/KWP Poznań)

Rycina 3. Ewakuacja poszkodowanego ze strefy CUF „chwytem strażackim" (źródło: Mikołaj Wegnerowicz/KWP Poznań)

and the need to remain in one place, it also causes consciousness disorders which do not allow the casualty to make rational decisions concerning evacuation from the danger zone. The choice of rescue technique depends not just on the tactical situation but also on the physical strength of the rescuer, the weight of the casualty and the terrain to be covered (distance and type of surface). During a man-carry evacuation of an unconscious person, it is extremely difficult to hold and control the limp body as it requires a lot of energy and concentration from the rescuer. Quick evacuation involves the risk of extending the injuries, loosening of tourniquets or causing an airway obstruction. However, leaving the casualty in the danger zone may bring a much greater risk of losing health or life.

Fireman's carry

Moving an unconscious person may require the use of both of the rescuer's arms in order to stabilize the body of the casualty in a fuller way. This involves the risk of slower reaction in the case of danger. Among the different man-carry techniques, one of the most popular and often used is the fireman's carry (fig. 3). The lift is performed by one person and the weight of the casualty is moved to the muscles of the back and shoulders of the rescuer, which are most resistant to anoxia. In order not to weaken the fire capacity of the unit, the rescuer may use handguns during evacuation. A rapid visual assessment of the casualty (body weight, amount of equipment) in comparison to the potential physical abilities of the rescuer leads to the decision whether this technique is a good choice.

Turtle carry

The "turtle" is an evacuation technique in which the casualty is transported on the soldier's back. The problematic part is lifting the casualty from the ground, especially if they have consciousness disorders or if their muscles are flaccid. The rescuer should lay the casualty on one side and then lie down in an identical position, so that his back is close to the casualty's chest. By holding the casualty's hand to the rescuer's chest and turning to a prone position, the rescuer drags the casualty onto his back. Any equipment carried on the back of the tactical vest of the rescuer makes the application of the technique more difficult and may cause problems during the rescue activities. Another difficulty is the complete inability of the rescuer to use a weapon in order to protect himself.

Rautek grip

Another technique is dragging the casualty with one grip point. One example is the Rautek grip, which can be used by a single rescuer. Starting from a position behind the casualty, a grip on the forearm allows the rescuer to hold the body in a safe and firm way, enabling the casualty to be dragged relatively long distances. However, success depends on the rescuer's equipment – a lot of equipment on the front side of the tactical vest makes the technique more difficult to use. Another option involves two rescuers, when a grip deep under the armpits should be considered (fig. 4 and 5).

With some modification, the casualty may be lifted and transported by more rescuers, e.g. by four people (fig. 6).

Figure 4. CUF area casualty evacuation using underarm grip (source: Maciej Sip)

Rycina 4. Ewakuacja poszkodowanego z CUF za pomocą chwytu pod pachami (źródło: Maciej Sip)

Figure 5. Casualty evacuation with two rescuers using the Rautek grip (source: Maciej Sip)

Rycina 5. Wykorzystanie chwytu Rauteka w ewakuacji prowadzanej przez dwóch ratowników (źródło: Maciej Sip)

Tapes and lanyards

Simple equipment in the form of a long rope with a karabiner at one end forms an alternative to man-carry techniques. The rope is thrown from behind the cover towards a conscious soldier, who fastens the karabiner to his equipment, such as the evacuation grip on his vest, which makes it possible for the rescuers to drag him closer. Tapes, lanyards and ropes have many applications in evacuation activities and may be used in various configurations.

Figure 6. Casualty evacuation with four rescuers (source: Tactical Medical Solutions)

Rycina 6. Ewakuacja poszkodowanego prowadzona przez czterech ratowników (źródło: Tactical Medical Solutions)

Dragon handle

A dragon handle is a set of tapes with two hand grips on one end and a karabiner on the other. Its advantages include good resistance to load and lightness. When packed it takes little space. During an evacuation process it is possible to constantly observe the combat area and, if need be, to fire. Depending on the force available, the evacuation may be performed by one or two people. A short distance from the casualty allows the rescuer to observe him and communicate with him.

Rat strap

The rat strap set (fig. 7) uses a similar rope technique as described in the dragon handle technique above, only the length of the rope itself being different. One of the ends may be thrown to the casualty from behind cover so that he can fasten it to his equipment. During the evacuation, the fastened part (known as the rat tail) is combined with the belt (part of the equipment) so both hands remain free. The fastening has a quick release mechanism to be used in the case of danger.

Hasty harness

This is a long, straight belt with ends combined to form a loop, very resistant and multifunctional. The skilled positioning of the belt on the body of the casualty and around him allows the rescuer to lift the casualty from the ground even if he is unconscious and the muscles are flaccid.

Figure 7. Using a Rat Strap Belt (source: Mikołaj Wegnerowicz/KWP Poznań)

Rycina 7. Zastosowanie taśmy *rat strap* (źródło: Mikołaj Wegnerowicz/ KWP Poznań)

High threat extraction kit

The High threat extraction kit is designed for members of assault teams and contains all the tools necessary for quick and efficient performance of rescue procedures in the CUF area. The time of use and efficiency of the products in the kit is a key factor for successful evacuation from the direct danger zone. The equipment has been designed as an "extension to the human body" in extreme conditions. Immediate evacuation of the casualty is a significant factor in survival and completion of the combat operation. The kit consists of dragon handle and rat strap tapes, a long hasty harness tape, a set of karabiners, a combat tourniquet and a chemical light.

Figure 8. Evacuation by ground vehicle (source: Marek Dąbrowski)

Rycina 8. Ewakuacja z pojazdu (źródło: Marek Dąbrowski)

Vehicular evacuation

If a vehicle has been immobilized and there is a need to evacuate the wounded driver or other members of its crew, the activities required depend on many conditions: tactical situation, vehicle position (on its wheels, on its side, on its roof), access to the inside and fire. All these will influence the decision as to which technique should be used to extract the casualty and the number of rescuers needed. Taking all these factors into account, the recommended method is to drag the casualty out of the vehicle and then to evacuate the casualty to a safe place. If the situation allows it, the evacuation may be performed by two rescuers. After approaching the vehicle, one of the rescuers kneels down in parallel to the doorstep of the vehicle, facing its front, while the other stands next to him. The task of the first rescuer is to free the legs of the casualty (free the feet from the clutch, accelerator and brake pedals/levers) and then drag them towards his arms until he can grip him under his armpits. At the same time, the other rescuer uses the Rautek grip to

Figure 9. Phantom litter (source: Tactical Medical Solutions)

Rycina 9. Nosze płachtowe *phantom* (źródło: Tactical Medical Solutions)

lift the casualty from the seat towards the outside of the vehicle (fig. 8). When both rescuers report readiness, the command to leave is given and they move away in a safe direction.

If the aim of the evacuation is to move the casualty to another vehicle, the proceedings are identical only in reverse order – the person holding the trunk of the casualty enters the vehicle first, going backwards and dragging the body of the casualty inside. If this technique cannot be used, it should be modified, so that the time the rescuers have to remain in the CUF area is not prolonged.

Tactical field care (TFC)

Activities in the TFC area involve performing rescue procedures in a relatively safe zone, without fire contact [5]. The tactical situation enables the use of ready-made evacuation platforms. As there is no direct contact with the enemy in this area, it is possible to examine the casualty, manage his wounds and prepare him for tactical evacuation. There are many ready-made evacuation systems available, and the choice of equipment for a given unit depends mainly on their tasks and the environment in which they must be performed. The equipment has been designed to take little space after packing, making it more practical for transport.

Phantom litter

This litter is sewn from a durable and abrasion-proof material, with a structure which can be folded down to very small dimensions so it can be easily transported under the vest or fastened below the backpack. The surface of the litter freely covers the body of the soldier, while the many handles on the edges enable transport by dragging or lifting, depending on the available force.

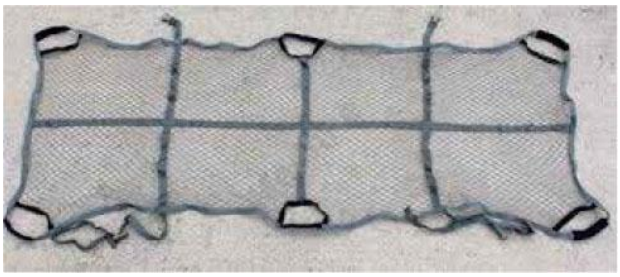

Figure 10. Individual Tactical Net Litter (source: www.medline.pl)

Rycina 10. Osobiste nosze taktyczne (źródło: www.medline.pl)

Apart from the lateral grips, the litter also features a belt at the chest level of the casualty, which may serve for securing the limp arms or the weapon of the casualty. The adequate number of grips ensures ease of transport both for the casualty and the rescuers, in various configurations of available forces. An additional advantage of the phantom litter is its multifunctionality: while it can be used for evacuation it may also serve as a case for personal equipment. The double layer of the material creates an empty space into which the personal equipment of the soldier may be packed. By pulling the belt in the middle of the litter, it can be closed in order to secure the equipment (fig. 9).

Individual Tactical Net Litter

The tactical net litter is small and light so it can be treated as an element of the personal equipment of each soldier (Fig. 10.). It is made of a durable polypropylene net, able to bear loads of up to 920 kg. It is stored in a closed package integrated with the tactical vest, on the reverse side. It is drawn from the package with the use of tapes. There is one tape on the top and two tapes at the bottom of the package. The net covers the whole body of the casualty and the package fixed to the vest ensures additional stability. Evacuation may be performed using dragging or lifting techniques. The number of grips enables the evacuation to involve up to six rescuers. A second version of the Tactical Net Litter may be transported as a separate package fastened to the rescuer's bag or equipment by karabiner. Apart from evacuation purposes, the manufacturer suggests an alternative function as a universal survival tool. In survival situations it may be used as a hammock, an element

Figure 11. Foxtrot litter (source: Tactical Medical Solutions)

Rycina 11. Zastososowanie noszy *foxtrot* (źródło: Tactical Medical Solutions)

of camouflage, a fishing net or the skeleton of a shelter.

Foxtrot

The foxtrot-type rolled litter is made of artificial textile and equipped with handles, stabilization belts and a long tape for dragging on the ground (fig. 11.). The litter is stored rolled (as a cylinder) inside a case, therefore taking very little space as well as being light and practical. With the foxtrot litter, the casualty may be evacuated both in the lying and sitting positions. Five pairs of belts with Velcro fittings or classical metal studs or clasps prevent the body from moving or sliding from the litter. The belts are located at the level of the chest, pelvis, knees (each leg separately) and the distal part of the lower legs. The leg belts may be also used for securing a long weapon, which should be positioned between the legs of the casualty. The casualty may be lifted thanks to the handles on either side of the litter or dragged/slid on the ground with the use of a handle or the long tape at the head end. The structure and elasticity of the material of the foxtrot litter does not always enable safe transport in rocky areas. The energy from contact with rocks sticking out of the ground is transmitted to the body of the casualty, which causes discomfort or may result in further injuries.

Tallon

The tallon litter is a typical example of a multi-task evacuation platform used for transporting a casualty. It can be carried by the rescuers or transported in a vehicle (fig. 12.). They form part of the standard equipment for combat vehicles in the Polish Military Contingent in Afghanistan.

Figure 12. Tallon litter (source: Maciej Sip)

Rycina 12. Nosze *tallon* (źródło: Maciej Sip)

A metal structure covered with a resistant net with a high bearing capacity (>500 kg). Both ends of the litter have ergonomic, foldable handles for comfortable evacuation by two to four rescuers. The bottom part of the litter is equipped with four supports that allow the litter to stand on the ground and which also form a universal fastening for vehicles, evacuation helicopters and airplanes. Thanks to this, the litter may be attached to the special fastenings on board Black Hawk helicopters while the handles allow its stable transport in AC-130 Hercules airplanes. The structure of the tallon litter includes six hooks for the assembly of medical equipment, such as for intravenous infusions. The litter has also two belts for the stabilization of the casualty. It can be folded to a quarter of its full dimensions and packed into a case, thanks to which it may be transported by one soldier.

Spinal board

A spinal board is rarely used on the battlefield. It is made of plastic resistant to abrasion and damage. It has fixed belts for the stabilization of the casualty as well as two stabilizers and two belts to immobilize his head in the horizontal position. The hard structure of the board protects the casualty from secondary damage to the backbone when stabilized in the horizontal position. The handles around the board allow the rescuers to hold it firmly and transport the casualty safely. The durable structure of the board makes it appropriate for any conditions: flat, mountainous or urban. It is compatible with MEDEVAC/CASEVAC evacuation equipment.

Table 1. 9-linear Medevac Report
Tabela 1. Dziewięcioliniowy meldunek MEDEVAC

Line/ linia	request	meldunek
1.	Location at HLS	miejsce odbioru
2.	Radio frequency, call sign and suffix	częstotliwość, sygnał wywoławczy miejsca odbioru
3.	Number of patients by precedence: A – urgent (up to 1 hr) B – priority (up to 4 hrs) C – routine (up to 24 hrs)	liczba poszkodowanych po priorytetach: A – pilny (do 1 h) B – priorytetowy (do 4 h) C – rutynowy (do 24 h)
4.	Special equipment required: A – none B – hoist C – extraction equipment D – ventilator	wyposażenie specjalne: A – brak B – podwieszenie C – wyciągarka D – respirator
5.	Number of patients by type: L – litter A – walking E – escorted (child)	liczba pacjentów wg typów: L – (+ #) na noszach A – (+ #) siedzący E – (+ #) eskorta (np. dziecko)
6.	Security at HLS: N – no enemy P – possible enemy E – enemy in area X – armed escort required	ochrona miejsca podjęcia/ lądowania: N – brak przeciwnika P – możliwość obecności przeciwnika E – przeciwnik w rejonie X – wymagana eskorta
7.	HLS marking method: A – panels B – signal pyrotechnic C – signal smoke (color) D – none E – other	sposób oznakowania lądowiska: A – panel (symbol) B – sygnał pirotechniczny C – sygnał dymny (kolor) D – brak E – inne
8.	Number and nationality status: A – ISAF/coalition forces B – ISAF/coalition civilian C – non ISAF/coalition security forces D – non ISAF/coalition civilian E – opposing forces/ detainee F – child G – embedded interpreter H – civilians from ISAF/CF	liczba i narodowość pacjentów: A – żołnierz ISAF/koalicji B – cywil ISAF/koalicji C – funkcjonariusz sił spoza ISAF D – cywil spoza ISAF/koalicji E – wróg/aresztowany F – dziecko G – tłumacz H – cywil raniony przez ISAF/ koalicję
9.	HLS terrain/obstacles	teren lądowiska/przeszkody terenowe

Table 2. MIST – supplement to MEDEVAC Report
Tabela 2. MIST – uzupełnienie meldunku MEDEVAC

M	Mechanism of injury (and time if known)	mechanizm urazu (czas, jeśli znamy)
I	Injury or illness sustained	uraz lub dolegliwość zastana
S	Symptoms and vital signs A – airway B – breathing rate C – pulse rate D – conscious/unconscious E – other signs	objawy i parametry życiowe A – drożność dróg oddechowych B – liczba oddechów C – tętno D – przytomność/brak E – inne
T	Treatment given (TQ and time, morphine)	wdrożone leczenie (np. staza i czas aplikacji, morfina)

Tactical evacuation (TE)

Battlefield rescue activities are aimed at the safe evacuation of the casualty from the danger zone and then rapid transport with MEDEVAC/CASEVAC to the field hospital, and further to higher-level medical facilities for the continuation of the treatment [6]. Medical procedures implemented at this stage of evacuation in a vehicle, such as an armored personal carrier (APC), medical evacuation vehicle, and MEDEVAC or CASEVAC vehicle are based on standards close to Advanced Life Support (ALS) and Advanced Trauma Life Support (ATLS) [7].

All medical interventions performed by evacuation teams are subordinate to the current tactical situation. Tactical evacuation in the Enduring Freedom/ISAF (International Security Assistance Force) operation in Afghanistan is conducted mainly in the form of airlift by helicopter. This is due to the high intensity of kinetic activities in the airspace, as well as the type of the terrain and large distances between the places of action and dislocation [6]. The transport time by air to a second level hospital does not exceed one hour (usually no more than 15-20 minutes from the injury). The MEDEVAC/CASEVAC procedure is preceded by submission of a 9-liner report to the Tactical Operation Center (TOC). The coordinates of the extraction area are given, and information about the number, nationality, condition of the casualty, activity of the enemy and pick-up area markings is transmitted with the use of a letter code. Table 1). The 9-liner report is supplemented with a MIST report, describing the mechanism and nature of the injuries, the casualty's condition (ABCDE scheme) and administered treatment (Table 2).

The waiting time before the MEDEVAC/CASEVAC vehicles arrive should be used for the assessment of the effect of the medical procedures applied so far. A casualty should be examined in detail using the MARCHE protocol (intended for the TFC phase). MARCHE is the acronym of: massive hemorrhages, airway and respiratory management, circulation,

hypothermia, head and eye injuries. One aspect which should be monitored very closely is the body temperature of the casualty, as it has a great influence on the blood coagulation processes. A 1°C loss of body temperature results in a 10% decrease in the ability to form a clot [8,9]. TCCC guidelines recommend using hypothermia prevention kits in the tactical environment. The hypothermia prevention and management kit (HPMK) should consist of an impermeable sleeping bag, a thermal blanket (maintaining approx. 53 °C for 8 h) and a head cover. Earplugs in the kit are aimed at protecting the casualty from excessive noise, increasing transport/evacuation comfort [2]. The method of extraction from the combat zone is dependent on available evacuation platforms or rope techniques, as well as the tactical situation and opportunities for airlift evacuation. In such severe conditions, one should remember to protect the eyes and vital organs of the casualty, by use of safety goggles or a ballistic vest [10].

Conclusions

If heavily wounded casualties remain on the battlefield, the chances of their survival decrease radically. The implementation of simple examination schemes, such as Tactical Patient Assessment (TPA) or the more advanced MARCHE protocol, depending on the tactical situation, is aimed at the identification of hemorrhages and securing life parameters. The evacuation of the casualty from the danger zone and transporting him to a field hospital is a crucial factor increasing the probability of survival.

Acknowledgements

The author would like to give thanks to PARAMEDYK, the exclusive distributor of Tactical Medical Solutions in Poland, for granting consent to publish the photographs in the article.

Literature

1. Committee on Tactical Combat Casualty Care: Tactical Combat Casualty Care Guidelines. Washington, Government Printing Agency, 17 September 2012
2. Sanak T, Dąbrowski M, Kluj P, et al. Specyfika udzielania pierwszej pomocy medycznej w warunkach bojowych w środowisku taktycznym na bazie standardu TCCC. Część II. Zapewnienie hemostazy miejscowej podczas wykonywania zabiegów ratowniczych w fazie taktyczno-bojowej opieki nad poszkodowanym na bazie standardu TCCC. [Specificity of providing first aid in tactical field care, based on the TCCC standard. Part II. Providing hemostasis while performing emergency procedures in tactical field care over the casualty, based on the TCCC standard] Anestezjologia i Ratownictwo, 2013; 3: 356-363
3. Committee on Tactical Combat Casualty Care: Tactical Combat Casualty Care Guidelines. Washington, Government Printing Agency, 18 August 2010
4. Zieliński M, Dąbrowski M, based on unpublished interview with Thomas G. LeClair, CD, BA, A-EMCA, ACP, DMS, EMT-T (Adv.) Special Operations Paramedic Ontario, Canada. TCCC – shock treatment – new recommendation from SOMA. 23 November 2013
5. Auerbach PS, (ed.). Combat and casualty care. In: Wilderness medicine. Philadelphia, Mosby Elsevier, 2012: 507-523
6. Clarke JE, Davis PR. Medical evacuation and triage of combat casualties in Helmand Province, Afghanistan: October 2010–April 2011. Military Medicine, 2012; 177 (11): 1261-1266
7. Dąbrowski M, Sanak T, Kluj P, et al. Specyfika udzielania pierwszej pomocy medycznej w warunkach bojowych w środowisku taktycznym na bazie standardu TCCC. Cz. 1. Przyczyny zgonów oraz odmienności w postępowaniu z poszkodowanym w warunkach bojowych w środowisku taktycznym na bazie standardu TCCC. [Specificity of providing first aid in tactical field care, based on the TCCC standard. Part I. Causes of deaths and differences in the patient handling in tactical field care, based on the TCCC standard] Anestezjologia i Ratownictwo, 2013; 2: 226-232
8. Watts DD, Trask A, Soeken K, et al. Hypothermic coagulopathy in trauma: effect of varying levels of hypothermia on enzyme speed, platelet function, and fibrinolytic activity. J Trauma, 1998; 44: 846-854
9. Higgins RA. MEDEVAC: critical care transport from the battlefield. AACN Advanced Critical Care, 2010; 21 (3): 288-297
10. Gerhardt RT, McGhee JS, Cloonan C, et al. U. S. Army MEDEVAC in the new millennium: a medical perspective. Department of Emergency Medicine, Brooke Army Medical Center, San Antonio, Aviat. Space Environ Med, 2001; 72 (7): 659–664